MANUFACTURER'S GUIDE SPECIFICATIONS

SECTION 07 27 23
RIGID FOAM BOARD INSULATING AIR BARRIER

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SECTION 07 27 23
FOAM PLASTIC INSULATION BOARD (FPIB) AIR, WATER-RESISTIVE AND THERMAL BARRIER

1 GENERAL

1.01 SECTION INCLUDES

A. Product: a foam plastic insulation board (FPIB) consisting of closed cell polyisocyanurate foam core laminated with a foil facer on both sides. Accessories provided by same manufacturer as FPIB for installation of a continuous barrier system.

B. Materials and installation as indicated in Drawings to provide continuous insulation, continuous air barrier and water resistive barrier in above-grade walls.

1.02 RELATED SECTIONS

A. Section 01 41 13 – Codes. [FPIB may trigger code requirement for NFPA 285 wall assembly test.]

B. Section 01 83 16 – Exterior Enclosure Performance Requirements. [Continuous insulation, continuous air barrier, hygro-thermal performance, proper integration of FPIB with neighboring components.]

C. Section 01 91 19 – Facility Shell Commissioning. [Address continuity of thermal and air barrier throughout the building enclosure, alignment of FPIB with fenestration thermal breaks, assure that FPIB does not interfere with wall weep/ drainage systems and address any other issues involving proper incorporation of the FPIB into the building enclosure.]

D. [Section] Cladding & Finish Attachment: If the FPIB is installed on the exterior side of the wall, exterior cladding shall be attached to structure through FPIB. If FPIB is installed on interior side of wall, interior finish shall be attached to structure through FPIB. Whether FPIB is installed on the exterior or interior, all penetrations made through the FPIB shall be sealed. This shall be accomplished by using fasteners with compression-seal washer plates, or by sealing the penetrations with insulation joint tape, foam sealant or caulking sealant. Evaluation of air and water leakage of the finished assembly is recommended in mockup construction. Sections affected include:
   1. Section 04 20 00 - Brick Veneer: through-wall flashing shall be attached to solid substrate
   2. Section 04 40 00 – Stone Veneer
   3. Section 07 42 00 – Wall Panels
   4. Section 07 46 00 – Siding
   5. Section 07 60 00 – Flashings and Sheet Metal
   6. Section 09 22 00 – Supports for Plaster and Gypsum Board
   7. Section 09 24 00 – Portland Cement Plastering
   8. Section 09 29 00 – Gypsum Board

E. Wall substrate to which FPIB will be attached shall be sound, and able to support required fasteners securing FPIB and claddings. Sections affected include:
   1. Section 03 30 00 - Cast-In-Place Concrete
   2. Section 03 40 00 – Pre-Cast Concrete
   3. Section 04 20 00 – Concrete Masonry Unit
   4. Section 05 40 00 – Steel Studs
   5. Section 06 11 00 – Wood Framing
   6. Section 06 16 00 – Wood Sheathing

F. Section 07 25 00 – Weather Barriers. Building wrap, paper or membrane materials affect the FPIB as follows:
   1. On base wall assembly: Cover weather barrier with FPIB. Secure or remove any loose material obstructing FPIB installation.
   2. Over FPIB: Not required, but may be specified with certain claddings. All fasteners penetrating FPIB shall be sealed.
   3. In adjacent construction: Tie into termination of FPIB as indicated in drawings and instructions.

G. Section 07 26 00 – Vapor Barriers. Sheet plastic installed on interior side of wall, or foil facing on stud cavity fiber insulation batts.
   1. FPIB is a vapor barrier. Installation of a plastic or foil vapor barrier is generally not recommended, as this can trap moisture between two vapor barriers.
   2. Determination shall be made by Design Professional to verify acceptable hygro-thermal performance of wall assembly

H. Section 07 50 00 – Membrane Roofing. Provide an air and water tight seal bridging the FPIB on the wall to the roof system air barrier.

I. Division 08 – Openings. Provide an air and water tight seal of fenestration to FPIB.

J. Facility Services Subgroup – Divisions 20 through 28. These trades may be penetrating the FPIB with mechanical, electrical, telecommunications or other service. Penetrations through the FPIB shall be sealed air and water tight.

K. Section [_____] Other

1.03 REFERENCES

A. American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Standard 90.1-2010 “Energy Standard for Buildings Except Low-Rise Residential Buildings”

B. ASTM C 209 Standard Test Methods for Cellulosic Fiber Insulating Board

C. ASTM C 518 Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus

D. ASTM C 920 Standard Specification for Elastomeric Joint Sealants

E. ASTM C 1289 Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board

F. ASTM D 1876 Standard Test Method for Peel Resistance of Adhesive

G. ASTM D 4073 Standard Test Method for Tensile-Tear Strength of Bituminuous Roofing Membranes

H. ASTM D 2126 Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging

I. ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials

J. ASTM E 96 Standard Test Methods for Water Vapor Transmission of Materials

K. ASTM E 154 Standard Test Methods for Water Vapor Retarders used in Contact with Earth under Concrete Slabs, on Walls or as Ground Cover

L. ASTM E 330 Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference

M. ASTM E 331 Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference

N. ASTM E 783 Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors

O. ASTM E 1105 Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform or Cyclic Static Air Pressure Difference

P. ASTM E 2178 Standard Test Method for Air Permeance of Building Materials

Q. ASTM E 2357 Standard Test Method for Determining Air Leakage of Air Barrier Assemblies

R. ASTM G 53 Practice for Operating Light- and Water-Exposure Apparatus (Fluorescent UV-Condensation Type) for Exposure of Nonmetallic Materials

S. NFPA 285 Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components

1.04 PERFORMANCE REQUIREMENTS

A. Assembly: Shall consist of FPIB fastened securely in place with all joints, penetrations and terminations sealed. Assembly built with minimum 1 inch thickness FPIB shall meet the following properties:
   1. Maximum air infiltration and exfiltration after load cycling 0.2 L/s*m^2 @ 75 Pa [0.04 CFM/ft^2 @ 1.57 PSF], ASTM E 2357
   2. No water leakage through assembly after 2h @ -6.24 PSF, ASTM E 331
   3. No visible damage or loosening of components after static and gust wind loading, ASTM E 330

B. Material Properties - FPIB

1. Shall consist of minimum 1 inch thickness closed cell polyisocyanurate foam core with embossed aluminum foil facing, both sides. Matte finish on at least one side.
2. Shall meet ASTM C 1289 Type I, Class 1, Grade 3 (25 psi)
3. Thickness and R-Value: 1.0 inch R-6.5, 1.5 inch R-10.0, 2.0 inch R-13.0, 2.5 inch R-16.5, 3.0 inch R-20.3, 3.5 inch R-23.0, units: $F*ft^2*h/$ Btu per inch. Measured at 75 degrees F mean temperature, as per ASTM C 518 according to requirements of ASTM C 1289.
4. Flame spread index: 25 or less and a smoke generation index: 450 or less, ASTM E 84
5. Air permeance: Maximum 0.02 $L/s*m^2$ @ 75 Pa [0.004 CFM/ft^2 @ 1.57 PSF], ASTM E 2178
6. Water vapor permeance: Maximum 0.1 Perm, ASTM E 96 A and ASTM E 96 B
7. Dimensional stability: Maximum 2% change after 7 days, ASTM D 2126
8. Water absorption: Maximum 0.05% volume, ASTM C 209

C. Material Properties – Insulation Joint Tape
1. Minimum thickness: 0.017 inch (17 mils)
2. Facer: aluminum foil, minimum 0.002 inch (2 mils) thickness
3. Adhesive: Non-asphalt, modified butyl minimum 0.015 inch (15 mils) thickness
4. Peak service temperature: Minimum 180 degrees F
5. Application temperature: 25 degrees and higher with contact adhesive
6. Insulation joint tape and contact adhesive shall be provided by same manufacturer
7. Flame spread index 25 or less, smoke generation Index: 450 or less, ASTM E 84
8. Water vapor permeance: Maximum 0.1 Perm, ASTM E 96 B
9. UV resistance: Unaffected after 2,000 h in QUV, ASTM G 53

D. Material Properties – Self-Adhered Flashing
1. Minimum thickness: 0.030 inch (30 mils)
2. Facer: aluminum foil, minimum 0.002 inch (2 mils) thickness.
3. Adhesive: Non-asphalt, modified butyl minimum 0.028 inch (28 mils) thickness
4. Peak service temperature: Minimum 180 degrees F
5. Application temperature: 25 degrees and higher with contact adhesive
6. Self-adhered flashing and contact adhesive shall be provided by same manufacturer
7. Flame spread index 25 or less, smoke generation index 450 or less, ASTM E 84
8. Water vapor permeance: Maximum 0.1 Perm, ASTM E 96 B
9. UV resistance: Unaffected after 2,000 h in QUV, ASTM G 53

E. Material Properties – Foam Sealant
1. Shall consist of one-component, low expansion polyurethane foam.
2. Flame Spread Index 25 or less, Smoke Development Index 450 or less, ASTM E 84
3. Cellular structure: Minimum 60% closed cell
4. Skin formation time: 10 minutes or less
5. Waterproof after full cure

F. Material Properties – Caulking Sealant

1. Shall consist of silicone, polyurethane or polyether.
2. Minimum solids content: 90%
3. Shall conform to ASTM C 920, Type 1, Grade NS, Class 25 or 50

G. FPIB Fasteners
1. Standard FPIB Fastener: Approved screw fitted with a low-profile plastic washer designed to grip and hold FPIB: Thermal-Grip CI Washer or Thermal-GRIP CI Prong Washer fitted with Grip-Deck screw. By Rodenhouse Fastening Systems
2. Brick Tie FPIB Fastener: Screw-in brick tie fitted with a low-profile plastic washer designed to grip and hold FPIB: Thermal-Grip Brick Tie Washer by Rodenhouse Fastening Systems with Heckmann Pos-I-Tie.
3. Equivalent fasteners by others are acceptable, if
   a. Fasteners are tested with FPIB and are verified to pass air and water leakage requirements in 1.04 A, OR
   b. Fastener penetrations are effectively sealed with caulking sealant or flashing tape.
4. [Other - Exterior cladding attachment hardware designed to secure FPIB. Penetrations through FPIB shall be sealed. Subject to approval by Design Professional.]

1.05 SUBMITTALS

A. Manufacturer's 15-year sample warranty covering FPIB R-Value, water intrusion and 180 day UV resistance.

B. Manufacturer's literature, including physical properties, installation instructions and detail drawings.

C. NFPA 285 submittal sheets for Project wall assemblies.

D. Manufacturer's literature for FPIB accessories including self-adhered flashing, insulation joint tape, transition membrane, FPIB fasteners and foam sealant.

E. Confirmation in writing of compatibility of FPIB with adhesives, tapes, membranes, coatings and other chemicals which are expected to come into contact with the insulation on the Project.

F. Sample of FPB, minimum 4 inch X 4 inch size

G. Samples of self-adhered flashing and insulation joint tape minimum 2 inch X 3 inch size.

1.06 QUALITY ASSURANCE

A. Installer Qualifications: Shall be experienced in applying the same or similar materials and shall be specifically approved in writing by FPIB manufacturer.

B. Product and Accessories shall comply with all state and local regulations controlling use of volatile organic compounds (VOCs)

C. Comply with the provisions of the Owner's building envelope commissioning program in accordance with [Section 01 91 15]

D. Pre-Installation Meeting: Convene [one] [_____] week prior to commencing Work of this Section, in accordance with [Section 01 31 19 - Project Meetings].

E. [Note to specifier: Mockup testing is recommended but not required. Retain paragraphs F, G and H if mockups will be built and tested.]

F. Field-Constructed Mock-Ups: Prior to installation on Project, apply insulation and accessories on mock-up to verify details under shop drawing submittals, to demonstrate tie-ins with adjoining construction and other termination conditions and to become familiar with properties of materials in application. [NOTE TO SPECIFIER: incorporate sub paragraph 1 or 2 into Paragraph E]
   1. Apply in field-constructed mockups of assemblies as specified in [Section 01 43 39 – Mockups]
   2. Construct typical exterior wall panel, 8 feet long by 8 feet wide, incorporating back-up wall, water resistive barrier, insulation, cladding, window and doorframe and sill and flashing, [building corner condition,] [junction with roof system] [foundation wall] [and] [typical penetrations and gaps]; illustrating interface of materials and seals

G. Test mock-up for air leakage in accordance with ASTM E 783. Measured air leakage rate shall not exceed 0.2 L/s*m^2 at 75 Pa (0.04 CFM/ft^2 at 1.57 PSF)

H. Test mock-up for water leakage in accordance with ASTM E 1105. There shall be no observed water leakage to the interior after 15 minutes at -6.24 PSF.

I. Perform visual inspection of Work before it is covered up. Take photographs and notes to document progress and quality.

J. Cooperate and coordinate with the Owner's inspection and testing agency. Do not cover any Work until it has been inspected, tested and approved.

1.07 DELIVERY, STORAGE AND HANDLING

A. Protect FPIB from physical damage.

B. Store FPIB pallets indoors, or store insulation pallets outdoors elevated above ground 4 inches minimum and covered with breathable UV-resistant tarpaulin.

C. Store insulation tape, self-adhered flashing, transition membrane and foam sealant in an area maintained between 50 and 90 degrees F and protected from precipitation and direct sunlight.

D. Handle FPIB carefully, so corners are not damaged or broken off.

1.08 WASTE MANAGEMENT AND DISPOSAL

A. Separate and recycle waste materials in accordance with [Section 01 74 19 – Construction Waste Management and Disposal], and with the Waste Reduction Work Plan.

B. Place materials defined as hazardous or toxic waste in designated containers

C. Ensure emptied containers are stored safely for disposal away from children

1.09 PROJECT CONDITIONS

A. Install FPIB and accessories within approved ambient and substrate temperature range and conditions stated in manufacturer's literature.

B. Do not apply FPIB or accessories over incompatible materials

C. Observe safety and environmental measures indicated in manufacturer's MSDS, and mandated by federal, state and local regulations.

2 PRODUCTS

2.01 PRODUCT: Provide embossed foil faced polyiso foam plastic insulation boards (FPIB) [] inch thickness [select R-value and thickness from 1.04 B] dimensions [select one: 4 ft X 8 ft, 4 ft X 9 ft, 4 ft X 12 ft or [other custom size]]

A. R2+ SHEATHE as manufactured by Carlisle Coatings & Waterproofing, Incorporated. 900 Hensley Lane, Wylie, TX 75098. Phone 1-800-527-7092. Website http://www.carlisle-ccw.com

B. [Other equivalent product as approved by Design Professional]

2.02 ACCESSORIES:

A. Insulation Joint Tape
1. Foil-Grip 1402 by Carlisle Coatings & Waterproofing Incorporated
2. Others as approved by FPIB manufacturer

B. Self-Adhered Flashing
1. Aluma-Grip 701 by Carlisle Coatings & Waterproofing Incorporated
2. Others as approved by FPIB manufacturer

C. Contact Adhesive: Provide from same manufacturer as self-adhered flashing and insulation joint tape
1. Carlisle Coatings & Waterproofing: Cav-Grip, Travel-Tack, CCW-702, CCW-702 WB or CCW-702 LV
2. Others as approved by FPIB manufacturer

D. Foam Sealant
1. FireBlock Gun Foam by TVM Building Products
2. Fireblock Foam Sealant by FOMO
3. Others as approved by FPIB manufacturer

E. Caulking Sealant:
1. Carlisle Universal Single Ply Sealant
2. Silicone, polyurethane or polyether as approved by FPIB manufacturer

3 EXECUTION

3.01 EXAMINATION.

A. Examine substrates, areas, and conditions affecting installation of FPIB for compliance with requirements. Verify that surfaces and conditions are suitable prior to commencing Work of this section. Do not proceed with installation until unsatisfactory conditions have been corrected.

B. Concrete wall surfaces shall be of sound condition and shall have honeycomb filled and sharp protrusions knocked off or ground flush

C. Concrete masonry unit wall surfaces shall be free of mortar droppings. Mortar joints shall be sound and tooled or struck flush.

D. Damaged or improperly-fastened exterior sheathing shall be remedied to comply with building code and sheathing manufacturer's requirements.

E. Wood or metal wall studs shall be of sound condition, properly spaced, plumb and laterally-braced according to structure and code requirements.

F. Wood substrates shall be dry. If in doubt, measure moisture content of wood with wood moisture meter. Do not install FPIB over wood substrates having 20% or higher moisture content.

3.02 INSTALLATION

A. Install FPIB with the matte finish side facing the installer.

B. Fasten FPIB in place as follows:
   1. Fasten FPIB securely to strong substrate. Provide fasteners designed for substrate as indicated in 1.04 paragraph G. Fastener shall penetrate substrate as follows:
      a. Metal studs: minimum 4 threads
      b. Wood studs: minimum 1 inch
      c. Plywood or OSB sheathing: minimum 1 inch
      d. Concrete: minimum 1-½ inch
      e. Masonry: minimum 1-½ inch
   2. Fastening FPIB to 24 inch on center or 16 inch on center studs:
      a. Maximum fastener spacing in studs: 16 inches on center.
      b. Board joints: Drive fasteners into board joint with washer bridging and securing two neighboring boards.
      c. 3-board Intersections: drive two fasteners maximum 4 inches on center as follows: one fastener into T-joint intersection with washer bridging 3 boards and additional faster into joint bridging 2 boards
   3. Fastening FPIB to solid wall: Space fasteners maximum 16 inches on center in field and 12 inches on center at terminations.
   4. At FPIB terminations, drive fasteners at least 3/8 inch from edge of boards.
   5. Minimize fastener penetrations through the FPIB. [Note to specifier: Fasteners which simultaneously attach FPIB and interior or exterior finish are preferred]

C. Abut neighboring FPIB pieces tightly together. Do not form 4-corner intersections. Offset board joints in neighboring rows 12 inches minimum.

D. Cut and fit FPIB around obstructions to allow snug fit onto wall surface or studs

E. Fill all gaps, cracks and holes through FPIB as follows:
   1. Improperly-driven or non-sealed fasteners: caulking sealant
   2. Small holes ½ inch max diameter: caulking sealant
   3. Board joints or gaps at terminations and penetrations exceeding 1/8" inch: foam sealant
   4. Larger holes 2 inch max diameter: foam sealant
   5. Holes or damage exceeding 2 inches across: patch with new FPIB

F. Where required by FPIB manufacturer, prepare all surfaces accepting insulation joint tape and self-adhered flashing with contact adhesive. Observe coverage rate, application technique and drying time in FPIB manufacturer's literature.

G. Cover FPIB joints between neighboring pieces with insulation joint tape, minimum 4 inch width, centered over joint.

H. Cover FPIB inside corners and outside corners with self-adhered flashing, minimum 3 inch bearing onto each side of the angle. Install self-adhered flashing tight into inside corners to avoid puncture and formation of water chase.

I. Apply self-adhered flashing at wall transitions and terminations. Provide 3 inch bearing onto dissimilar substrates.

J. Apply self-adhered flashing around pipe, duct and beam penetrations through FPIB.

K. Wrap window openings with self-adhered flashing. Self-adhered flashing shall bear onto FPIB surface 3 inches minimum and shall return into opening according to Project window details.

L. In opening and corner details, self-adhered flashing shall extend at least 2 inches onto FPIB facer or onto sound substrate. Do not terminate self-adhered flashing on foam core edge of FPIB.

M. Firmly press in place all insulation joint tape and self-adhered flashing details using a roofing seam roller or similar tool. Hand pressure alone is not sufficient.

3.03 REPAIR AND PROTECTION

A. Protect FPIB from mechanical damage and exposure to open flame during installation and exposure.

B. Repair damage to FPIB as recommended by manufacturer before covering.

C. FPIB is not approved for permanent exposure. Cover exterior with code-approved cladding. Cover interior with code-approved thermal barrier.

D. Cover exterior-applied FPIB with cladding as soon as schedule permits. Maximum permitted exposure time to weather:
   1. 60 days without joints sealed, openings and details flashed
   2. 180 days with joints sealed, openings and details flashed

END OF SECTION